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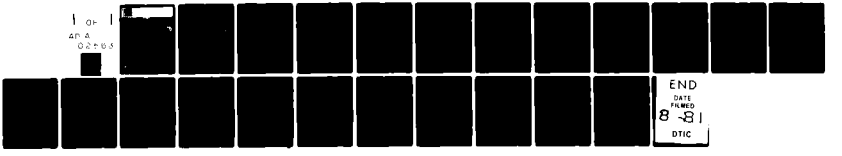

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Critical Issues in Maritime Transportation

Maritime Transportation Research Board

Commission on Sociotechnical Systems

CRITICAL ISSUES IN MARITIME TRANSPORTATION

July 1980

(Revised June 1981)

Prepared by the

MARITIME TRANSPORTATION RESEARCH BOARD
Commission on Sociotechnical Systems
National Research Council

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This report has been reviewed by a group other than the authors according to procedures approved by a Report Review Committee consisting of members of the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine.

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PREFACE

The Maritime Transportation Research Board (MTRB) was organized in 1965 by merging two activities of the National Research Council. One predecessor organization, the Ship Hull Research Committee, had been formed during World War II as the Committee on Ship Steel to examine the serious problem of cracks in welded ships. The other, the Maritime Cargo Transportation Conference, had been formed in 1953 to work on problems of containerization and mechanization. Thus, for nearly 40 years the MTRB and its forerunners have been addressing a broad range of problems of significance to the U.S. maritime industry.

As MTRB meets to consider projects appropriate for its study, it assigns priorities to the projects. In determining such priorities, it would be preferable if the order of importance could be measured within the framework of an agreed set of national maritime objectives or better yet, a comprehensive national maritime policy. Regrettably, agreed objectives are lacking in many areas, and there is no overall statement of policy to serve as a guide. There are, however, a number of recognizable basic issues which would have to be considered in the formulation of any meaningful national program. These can be termed the critical issues, and in this report, MTRB identifies them along with several sub-issues associated with them.

The range of issues is broad and the need for examination of these issues is urgent. It is not suggested however that all are appropriate for study by MTRB. Those issues whose resolution may be approached through research are suitable for its consideration. On the other hand, issues involving the creation or alteration of basic policy are more properly addressed through the political process. Even here, however, while MTRB does not function to recommend policy, it may serve as a neutral forum for the conduct and evaluation of research associated with policy issues.

For these reasons, it is felt that this list of current critical issues as perceived by MTRB should be recorded with the thought that it will be of assistance to planners and administrators in both government and industry.

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INTRODUCTION

The U.S. merchant marine is relatively small by industrial standards, but it plays a large role in national and international affairs. In time of war its service is vital. In time of peace it has, or ought to have, a positive effect on the nation's balance of payments and economic well-being.

The Congress has mandated that the United States have a merchant marine to carry its domestic waterborne commerce and part of its foreign waterborne commerce, and to serve the armed forces during national emergencies. The mandate is expressed in the Shipping Act of 1916 and the Merchant Marine Acts of 1936 and 1970. These Acts has established regulations and financial-aid and promotional programs designed to improve the competitive position of the maritime industry relative to its foreign counterpart.

In spite of Congressional intentions and industrial efforts, the stated objectives have not been met. Whether the industry can achieve economic health without changes in present regulations and financial aid programs is in question. Since World War II, the fraction of the nation's waterborne commerce carried by the U.S. merchant fleet has declined, and the capability of the fleet has declined as well. For many reasons, U.S.-flag ships have serious difficulties competing internationally.

The mechanisms established by the Shipping Act of 1916 may have lost their effectiveness, and the Committee on Merchant Marine and Fisheries of the U.S. House of Representatives has held extensive hearings on the vital issues of a new system of shipping conferences, shippers' councils, and bilateral and equal access cargo-sharing agreements.

The Merchant Marine Act of 1936 also has come under scrutiny. The Act was designed to meet the commercial maritime needs of the depression era through two kinds of aid: Operating-Differential Subsidy (ODS) and Construction-Differential Subsidy (CDS). Since then, the activities, organization, operation, and composition of the U.S. merchant marine have changed substantially, and the fleet faces a different set of problems.

Even the 1970 Amendment to the Merchant Marine Act of 1936 did little to stop the steady decline in the size and capability of the fleet. The Act sought to expand and increase subsidies to the tanker and dry bulk segments of the U.S.-flag fleet. But the goal of constructing 30 ships per year over a 10-year period was never reached.

The foregoing legislation, designed to increase the proportion of foreign trade carried in U.S. bottoms has failed to achieve stated objectives. The allocations of a portion of government financed trade to U.S. bottoms has helped to retain only a small and steadily decreasing share (currently less than five percent) of the nation's waterborne foreign trade for U.S.-flag vessels.

CRITICAL ISSUES

The problems facing the U.S. maritime industry entail concerns that range broadly over defense, operations, finance, regulation, and facilities and equipment. To provide a framework for description and analysis, these problems and concerns are treated here in terms of nine critical issues:

1. Cargo for U.S.-Flag Vessels
2. Federal Aid
3. National Security
4. Federal Regulation
5. Shipping Industry Practices
6. Shipbuilding and Repair
7. Maritime Safety
8. Harbor Improvements
9. Energy Transport on Inland Waterways

(The numerical designation is for identification, it is not intended as a priority ranking.)

CRITICAL ISSUE 1

CARGO FOR U.S.-FLAG VESSELS

Background

Despite a variety of federal policies designed to foster an effective, economical, and competitive U.S.-flag merchant marine, the United States has not attained this goal in nonliner trade. The U.S.-flag fleet has shrunk during the past decade to the point where the oceangoing merchant fleet numbers fewer than 600 vessels. The shrinking size of the fleet is both a cause and result of the small proportion of the nation's foreign trade carried in U.S.-flag vessels.

Despite the 1970 amendment of the Merchant Marine Act which extended aid programs to include tankers and bulk carriers, U.S.-flag ships continue to carry less than five percent of the nation's waterborne imports and exports, which currently total over 700 million tons annually, as shown below for 1978:

Imports and Exports - 1978

Type	Total Tons (millions)	Tons Carried by U.S. Flag Ships (millions)	Percentage Carried by U.S. Flag Ships (percent)
Liner	56.5	16.0	28.3
Nonliner	308.8	4.5	1.5
Tanker	410.3	11.6	2.8
Total	775.6	32.1	4.1

Almost 90 percent of the nation's most strategic materials are carried in foreign ships. Lack of cargoes for the U.S. fleet means fewer ships, fewer trained operating crews, and fewer U.S.-flag ships available for national defense. In times of emergency, U.S. defense and economic security are vulnerable to the policies and political exigencies imposed on non-U.S.-registered ships trading in the nation's commerce.

Points at Issue

The declining economic health of the U.S.-flag fleet, resulting from the small share of the nation's waterborne import and export trade that it carries requires detailed examination, free of the preconceptions of special interests. Such an examination should consider:

- The factors behind the small share of the nation's import-export traffic carried by U.S.-flag vessels.

- The degree of economic vulnerability, and its possible consequences, that results from growing dependence on a non-U.S.-registered fleet.

- Alternative strategies to increase the amount of dry bulk and tanker cargoes carried by the U.S.-flag merchant fleet.

- The advantages and disadvantages of bilateral and multilateral cargo-sharing agreements as a means of ensuring cargoes for U.S.-flag ships.

- The effectiveness of U.S. Government supports in achieving greater participation by U.S.-flag vessels in carriage of foreign trade.

CRITICAL ISSUE 2

FEDERAL AID

Background

Virtually all governments support their merchant fleets financially in one way or another. The United States is no exception. Since before the Merchant Marine Act of 1936, there has been a subsidy program for the liner segment of the U.S.-flag fleet. Both construction-differential and operating-differential subsidies are available and are aimed at making both U.S. shipyards and ship operators more competitive with foreign companies. The 1970 Amendments to the Merchant Marine Act of 1936 contained provisions for extending these subsidies to both liquid and dry bulk carriers because 40 percent of U.S. oceanborne trade consists of dry bulk cargoes, while U.S.-flag ships carry less than 2 percent of this trade.

Considerable criticism has been directed at the U.S. maritime aid programs, particularly Construction-Differential Subsidy (CDS) and Operating-Differential Subsidy (ODS). Some argue that they are too costly; others claim they are not adequate to achieve their objectives, especially when compared with foreign subsidy programs.

Not all U.S.-flag lines eligible for construction and operating subsidies seek them. They claim that greater benefits can be realized by being free of government regulations.

Ship owners who do receive operating subsidies consider them necessary when operating on essential trade routes. They content that the absence of ODS would place operators at an economic disadvantage because of higher U.S. operating costs and wages. The result would be a reduction in the number of U.S. operators remaining in service especially in the liner trades.

Adequate construction subsidies have been available for the past several years, but only a limited number of commercial operators have taken advantage of them. The net result is little expansion in the U.S.-flag fleet.

Points at Issue

The provision of financial aid is as much a political as it is an economic issue. Still, it represents a major area and should be investigated. Such investigation should include:

- A comparison of U.S. maritime-industry subsidies with those of other U.S. transportation industries.
- A comparison of U.S. maritime-industry aids with those of Western European nations, Japan, Brazil, and other maritime countries.
- A study of subsidy treatment for different types of applicants, including those who receive indirect subsidies (e.g., protection by the Jones Act) and those who also operate foreign flag ships.
- An assessment of the advisability of using ODS and the Jones Act, in addition to CDS, to subsidize shipbuilding indirectly.
- A review of the impact of subsidy expenditures to date in carrying out the legislative objectives.
- A study of the effectiveness of other federal financial aids, such as tax incentives and loan guarantees.

CRITICAL ISSUE 3

NATIONAL SECURITY

Background

The need for the United States to be able to handle its waterborne commerce in U.S.-flag ships has been debated since the earliest days of the Republic. The preponderant opinion, resulting from wars and other national emergencies, lies on the side of maintaining an adequate U.S. capability. In addition, Congressional committees have expressed interest in greater reliance by the Navy on use of the merchant marine for routine logistics support.

A problem in maintaining a national policy on this subject results from inability to move from a qualitative requirement to an accepted and reasonable quantitative statement. Perceptions differ among those who deal in strategic assessments, the ship operators, the shippers who use their services, those charged with maintaining our relations with other nations, and the legal and regulatory community, which is charged with insuring equity among industries and to the public. Further, commercial considerations have resulted in merchant-ship designs that, in most cases, are not compatible with military requirements.

Points at Issue

A U.S.-flag merchant marine is an essential ingredient of our national strength. A firm statement of this national intent is contained in the Merchant Marine Act, but a quantitative measure of it is unavailable. There is a need to bring the numerical requirements into sharper focus so as to permit a more specific approach to support for the merchant fleet. The pertinent questions:

- What types and numbers of merchant ships are required to fulfill national defense requirements, both during periods of emergency (undeclared war) and declared war?
- How can commercial and defense requirements be integrated in ship construction?
- To what degree is it practical to consider the foreign-flag fleet under effective U.S. control as an auxiliary merchant fleet during times of emergency of declared war?
- What is the value of retaining merchant ships in the National Defense Reserve Fleet (NDRF) for rapid reactivation, as opposed to securing the necessary ships through construction programs, purchases, or requisitions?
- How can we assure the availability of sufficiently trained operating crews, licensed and unlicensed, to man the ships?

CRITICAL ISSUE 4

FEDERAL REGULATION

Background

The higher standard of living and wages of U.S. mariners relative to most of their foreign counterparts has caused many problems for the U.S. shipping industry, which must compete in international markets.

Improved productivity through mechanization generally has been quickly followed by foreign competitors. Some improvements in productivity, such as containerization, are geared to port modernization world-wide and are available to all. U.S. efforts to offset the cost disadvantages of U.S. operators by means of subsidies have generally been offset by financial aid by other governments to their fleets.

In addition to the foregoing cost disadvantages, the U.S. fleet has been subject to stricter safety standards, antitrust constraints, and pollution controls than most foreign fleets. The United States has tried to impose many of its regulations on foreign operators trading with this country, but enforcement of some is difficult, and foreign governments are openly challenging U.S. authority to enforce them.

The regulatory environment for maritime commerce is in a period of worldwide examination and impending change. These changes include reporting of conference activity, tariff publication, and nondiscrimination of tariffs among ports, areas, shippers or carriers. They would also define the conditions under which consultation between carriers and shippers (or shippers' councils) would be permitted.

The United Nations Code of Conduct for Liner Conferences, which includes consideration of foreign-flag registries, would make further regulatory change in international shipping.

Points at Issue

The state of flux in the regulatory climate in which the U.S. merchant marine must compete gives rise to a number of questions, including the following:

- What effect will the proliferation of national-flag fleets in the developing countries have on the competitive position of the United States in country-to-country and cross-trades?
- What will be the effect on U.S. shipyards of foreign-built ships being able to qualify for U.S. operating-differential subsidies?
- How do environmental-protection and safety-oriented rules affect the comparitive costs of U.S. and foreign shipping?
- What is the effect of rate regulation on the competitive environment?

CRITICAL ISSUE 5

SHIPPING-INDUSTRY PRACTICES

Background

The movement of cargo can no longer be viewed as a number of disconnected activities, requiring shipping to a port, carriage by sea, delivery to consignee, and the loading, unloading, and storage activities that link each of these movements. Instead, cargo movement must be viewed as a system requiring integration of all such elements to achieve maximum economic efficiency.

As an integrated system, shipping is a series of linkages of ocean and land carriage. These linkages are evident in "land bridge," "minibridge," and similar types of overland connection to oceangoing carriers. In essence, these approaches substitute joint intermodal land-water service for all-water service over some portion of the total shipper-to-consignee movement.

Shipping services are subject to litigation and regulatory proceedings to resolve the conflicting interests of various ports, carriers, and shippers. The Shipping Act of 1916, which provides the basis for regulation, was designed for break-bulk cargo. Many in the maritime industry consider the law outmoded by containerized cargo operations.

Shippers and port managers are concerned about the effects of intermodal rates if they are adopted along the lines advocated by the carriers. The shippers object to adding ocean and inland rates together with no reduction in total rates charged and no improvement in service. They also oppose any tying arrangements for the inland portion of the carriage and any extension of the jurisdiction of the Federal Maritime Commission (FMC) to land transportation. Ports, especially in the Great Lakes, are fearful of intermodal rates and their effect on reducing traffic and jobs for their ports. They are particularly concerned about the consequences of allowing deferred rebates to apply to intermodal tariffs.

Points at Issue

The emergence of cargo movement as in integrated system of ocean and land linkages requires careful assessment of a number of significant questions:

- Who benefits and who is harmed and to what extent by land-bridge and minibridge systems?
- Are intermodal or through rates equitable to all parties in the transport system?

- Can regulatory responsibility residing in different agencies be harmonized or unified?

- Do intermodal systems discriminate against certain geographic areas? How can regional interests be better harmonized with national interests?

- Are shipping regulations compatible with container and other intermodal systems?

- Can present container systems be improved? Is container ownership in the proper hands for the most economical system?

- Are port facilities staying abreast of the needs of intermodal systems?

CRITICAL ISSUE 6

SHIPBUILDING AND REPAIR

Background

The vitality of U.S. commercial ship building and repair facilities depends largely on the health of the nation's merchant marine and federal policies on the size of the Navy and Coast Guard. Shipbuilding and repair activities are under extreme and constant pressure from highly competitive foreign shipyards, which offer to build vessels at extremely low prices with assurance of support from their governments. Based on this government support, and to ensure their survival during this time of depression, overseas yards sre quoting prices on construction of new ships at 20 to 40 percent below actual costs. This places an awesome burden on U.S. shipbuilders competing in a worldwide market.

In 1979 two major U.S. ship operators signed letters of intent or contracts with Japanese or Korean shipyards for construction of 24 large containerships at an average cost of about $33 million each. It is expected that the total cost of these vessels if contracted for in U.S. yards would have been not $800 million, but two and one half times-to-three times that amount. During 1979, at least one major U.S. shipyard closed its doors on shipbuilding, leaving a 225,000-ton tanker and a number of other vessels uncompleted.

Published figures on shipyard employment indicate that at the start of 1978, 32,000 shipyard employees were working on the construction of U.S. merchant ships. By the start of 1980, this number had shrunk to 21,000, and work on ships under present contracts will be completed by the end of 1983.

The ship-repair industry, while suffering some of the problems of its sister shipbuilding activity, is relatively stable and in some areas is competitive with overseas repair yards. While marine repairs in Far East facilities generally cost less and require less time, this is not necessarily true in other parts of the world. For example, many U.S. repair facilities on the Gulf do extensive work on ships based in South America because U.S. Gulf prices are at least competitive and, more importantly, because the repairs are generally completed in much less time.

Commercial shipbuilding and marine-repair activities suffer from similar problems--the work is dirty and much of it is done outside in all extremes of weather. In addition, depending on geographical area, the work sites are in dry docks, on building ways, or in half-finished ships, which are either humid and sweltering during the summer or icy and frigid during the winter. Because of these working conditions and a somewhat lower pay scale than in the aerospace industry and government shipyards, the commercial shipbuilding and repair industries have some difficulty retaining a stable work force. Efforts to recruit and retain young workers through apprentice and training programs have not been overly successful. This lack of success and the shifting of trained and skilled workmen to other industries create a serious shortage of trained manpower in both shipbuilding and repair.

Points at Issue

The decline of U.S. shipyards requires detailed examination to determine how they can be revitalized to provide a much needed national asset. Such an examination should consider such factors as:

- Government support by major foreign shipbuilding countries to assure that their yards remain competitive even in times of depression.
- Problems involved in recruiting, training, and retaining shipyard workers.
- Sustained national shipbuilding policies and programs that would help U.S. shipyards to become more competitive.
- Methods used by major shipbuilding centers such as Japan to produce ships of standarized designs that can be constructed at minimum cost.
- Construction techniques and production methods used by foreign shipyards to build ships at minimum cost.
- Cost effects on shipbuilding of statutory requirements in areas such as environmental protection and occupational safety and health.
- Impact on supporting industries.

CRITICAL ISSUE 7

MARITIME SAFETY

Background

Despite many continuing efforts by the U.S. and other governments and by private industry, vessel accidents of all types are increasing. For many years, particularly at the national and international levels, extensive efforts have been made to alleviate the problem through regulatory action. The emphasis has been on physical solutions--design, construction, equipment, redundancy, and recently, to some extent, vessel operating requirements. Research, studies, and developments in these areas, have been extensive and certainly have been productive to a degree, but the problem remains with us.

Only in very recent years has any concerted effort been made on the aspect of maritime safety that all the evidence suggests is one of the most serious problems--people. Emphasis on personnel training, qualification, and development of experience has come only recently because of the difficulty and, in some cases, even the nebulous nature of the problems to be solved. Research on personnel in maritime safety has been sparse, sporadic, and generally uncoordinated. There is a real need for a thorough, unbiased, practical approach to this aspect of the safety problem. Piecemeal efforts currently under way are productive, but the gravity of the situation, aggravated by increased public concern over marine casualties, requires that the problem be studied carefully, and that well thought-out measures be generated.

Points at Issue

The global shipping recession of recent years has put severe pressure on operating budgets. Maintenance objectives have been lowered in some companies, and senior technical management has dispersed to more lucrative fields. That these events seem to be correlated with a rise in the worldwide casualty rate suggests a need for an investigation of possible causal connection. There are additional clear-cut needs:

- Development of a rational program for maritime safety, including reasonable safety objectives and measures for evaluating performance.
- Creation of a means of enhancing safety-mindedness within the maritime community.
- Attacking problems of casualties associated with human failure.
- Examination of casualties associated with inadequate vessel standards for operating, crewing, and maintenance.
- Examination of needs for vessel traffic control and ship maneuverability improvements.

CRITICAL ISSUE 8

HARBOR IMPROVEMENTS

Background

Rapid introduction of technical innovations in handling and moving cargo, and legislation such as the Clean Water Act, have placed new burdens on seaports. The larger vessels designed to reduce unit costs re2uire deeper harbors and ship channels, more maneuvering space, and more sophisticated and capital-intensive port facilities. In some cases, new technical demands have shifted patterns of cargo movement, resulting in major changes in work opportunities.

In many ports, the approach channels and facilities are physically obsolete, inadequate, or unsafe for handling modern ships. Increased capital requirements, sharply rising costs, parochial interests, and concern for the environmental effects of dredging and spoil disposal have mitigated against port modernization and improvement. The problem is compounded by the time and costs involved in meeting permit, safety, and cargo-security requirements.

The cost of modernizing port facilities is high. Large capital requirements and high interest rates cause great difficulty, especially for smaller ports, in raising the funds needed to make major improvements in facilities. Large, high-productivity ships must limit the number of their port calls, which causes consolidation of traffic in a few major ports and leaves smaller jurisdictions unable to raise the capital required for modernization. While this development lowers the costs of international trade, it may not necessarily be favorable in terms of national defense.

Ports are the link between water and land transportation. Access to land transportation, therefore, is necessary to maintain an adequate flow of cargo through a port. Truck or rail movement to and from terminals can be severely restricted at metropolitan waterfront locations. Bottlenecks on either the land or water side of a terminal can severely reduce its competitive ability.

Points at Issue

The following difficulties appear to be the principal ones faced by ports:

- Capital requirements snd the costs of financing major improvements.
- Disposal of spoil from dredging and maintenance of channels and harbors to accommodate larger ships.

- Weakening of national defense caused by concentrating terminal facilities at a few ports.

- Environmental and siting problems associated with petroleum and hazardous-cargo terminals.

- Effects on labor and the community of consolidating or relocating ports.

CRITICAL ISSUE 9

ENERGY TRANSPORT ON INLAND WATERWAYS

Background

A major reason for the high productivity and standard of living in this country has been low-cost energy. The nation's per-capita consumption of energy is considerably higher than in most other countries in the world.

The nation obtains almost half of its energy from petroleum, but continued deterioration in the reliability of supply and increases in the world price make it obvious that we cannot continue to rely on that fuel. Public concern about the safety of nuclear power suggests that expansion of that source of energy may not be relied upon. Extensive research and development are under way on more exotic sources of energy, but it is doubtful that sny of them will provide a signficant fraction of U.S. needs until well into the 21st century. For the remainder of this century and well into the next, therefore, it is reasonable to expect that our energy needs will be met largely through current energy technology, including increased use of coal.

Movement of coal from mines to power plants is, and will continue to be, a major problem. Inland waterway transportation is unequaled in cost and energy efficiency in moving coal if the mine and consumer have access to navigable waterways. Coal now accounts for about one third of the tonage that moves on the waterways of Mid-America (the Mississippi River and tributaries, the Alabama rivers, and the Gulf Intracoastal Waterway). Several studies have predicted increases in the amount of western coal that move on those waterways. The Mid-America Port Study forecasts that coal movements on the Mid-America waterway system will more than double, to more than 210 million tons annually, by the year 2000. Traffic on the system is limited to about that level by 13 locks that will reach reasonable capacity before the year 2000 and then will cause extensive delays in barge movements.

In addition to the constraints imposed by the locks, large investments will be required for facilities to load and unload coal at riverfront ports. By the year 2000, new loading facilities for more than 130 million tons of coal per year and new unloading facilities for more than 105 million tons per year will be needed.

Points at Issue

The critical role of coal in the future of the nation, and the significance of reliance on the inland waterway system to move it, create the following needs:

- Assurance of the capacity of the waterways to handle projected movements of coal and other commodities.
- Establishment of a priority system at locks for movement of energy products, including coal.
- An analysis of the federal role in waterway transportation of coal, including subsidies for the development of loading and unloading facilities.
- An analysis of the effect of user charges for waterway transportation of coal.

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The foregoing nine issues are the ones that the Maritime Transportation Research Board considers to require the most urgent attention if we are to restore the U.S. merchant marine to the health condition required for it to support our foreign commerce and national security requirements. The list does not exhaust the problems facing the industry but suggests a sense of priorities for beginning the process of rejuvinating the U.S. Merchant Marine.

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This report describes and discusses the nine most critical, current issues in the field of maritime transportation as perceived by the National Research Council's Maritime Transportation Board. The nine issues, in no priority order are, Cargo for U.S. Flag Vessels, Federal Aid, National Security Federal Regulation, Shipping Industry Practices, Shipbuilding and Repair, Maritime Safety, Harbor Improvements, Energy Transport on Inland Waterways.

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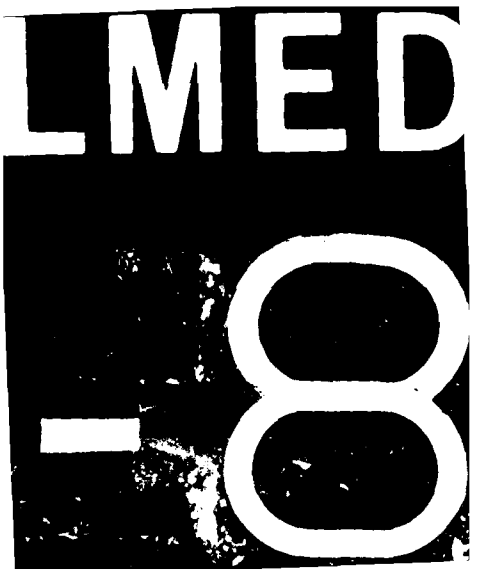
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